CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

May 29, 2002

Robert Cochran
Project Manager
Duke Energy North America
505 14th Street, Suite 940
Oakland, CA 94612

Dear Mr. Cochran:

**AVENAL ENERGY CENTER PROJECT (01-AFC-20) DATA REQUESTS**

Pursuant to Title 20, California Code of Regulations, section 1716, the California Energy Commission (Energy Commission) staff requests that Duke Energy North America supply the information specified in the enclosed data requests. The subject areas addressed in the attached data requests are transmission system engineering, visual resources, and public health. Staff requests that the responses be sent together in one complete document rather than fragmented.

Written responses to the enclosed data requests are due to the Energy Commission by July 1, 2002 or at such later date as may be agreed upon by the Energy Commission staff and the applicant. If you are unable to provide the information requested in the data requests or object to providing it, you must contact the committee assigned to the project, and the project manager, within 10 days of receiving these requests stating your reason for delay or objections.

If you have any questions regarding the enclosed data requests, please call me at (916) 653-1227.

Sincerely,

Lance Shaw
Siting Project Manager

Enclosure
cc: Proof of Service 01-AFC-20

# AVENAL ENERGY PROJECT
# DATA REQUESTS
# (01-AFC-20)

**Technical Area: Transmission System Engineering**
**Authors**: Ajoy Guha, P. E. and Sudath Arachchige
**Technical Senior**: Al McCuen

## BACKGROUND

Staff needs a complete interconnection study to analyze potential impacts to reliability, to identify the interconnection facilities, and any new and/or modified downstream facilities necessary to support interconnection of the Avenal Energy Project (AEP) to the Pacific Gas and Electric (PG&E) system.

After reviewing the System Impact Study report by PG&E dated February 19, 2002 and the Cal-ISO letter of March 20, 2002 to Duke Energy North America, staff observes the following:

1. The proposed queue generation projects R (1000 MW at the Los Banos substation 230 kV bus), T (1000 MW at the Los Banos substation 500 kV bus) and Y (1367 MW at Los Banos substation 230 kV bus) as modeled in the Power Flow base cases have not filed an Application for Certification (AFC) with the California Energy Commission (CEC) and have not yet engaged in pre-filing meetings with the CEC staff. It is, therefore, uncertain that these projects could be on-line in 2004 to cause any cumulative incremental or new overloads.

2. The system model in the Power Flow base cases did not include the PG&E approved project T765 for installation of a third Midway substation 500/230 kV transformer bank by July 2002.

3. Power Flow studies for the 500 kV double line outages or 500 kV bus faults were not conducted. These studies are necessary to determine if the AEP should be included in Remedial Action Schemes (RAS) and/or Special Protection Schemes (SPS).

4. Additional sensitivity studies are necessary to identify system impacts for high/low Path 15 and Path 26 flows and transmission facility flows limited by summer peak and light spring or light summer ratings.

5. SPS or operational solutions should be developed or system upgrades may be required to mitigate overload impacts on the 70 kV Arco-Gates system.

6. Supplemental Studies are necessary to determine feasible alternatives for interconnection of the AEP considering the impact of the Path 15 upgrade project and high/low Path flows, full system impacts, appropriate mitigation measures and/or SPSs, and final selection of system configuration and project interconnection.

7. Additional mitigation alternatives should be studied for reinforcement of the Gates-Avenal-Arco-Midway 230 kV lines. To eliminate overloads resulting directly from interconnection of the AEP , the mitigation measures identified with the system configuration used in the study are as follows:

a. Avenal-Gates 230 kV line: Increase the rating of the line to equivalent 2x795 ACSR conductors of remainder of the line section either by adding a second 795 ACSR conductor or by reconductoring the existing 795 ACSR conductor to equivalent 2x795 ACSR, for about 1.0 mile length from Gates substation to Tower 137/626B. another option is to reconductor the existing line for its entire length to a minimum size of 1113 SSAC conductor to meet emergency loading.

b. ARCO-Avenal 230 kV line: Increase the rating of the line to equivalent 2x795 ACSR conductors of remainder of the line section either by adding a second 795 ACSR conductor or by reconductoring the existing 795 ACSR conductor to equivalent 2x795 ACSR, for about an 8.0 mile length from ARCO Tap to ARCO substation.

c. ARCO-Midway 230 kV line: Increase the rating of the line to equivalent 2x795 ACSR conductors of remainder of the line section either by adding a second 795 ACSR conductor or by reconductoring the existing 795 ACSR conductor to equivalent 2x795 ACSR, for about an 8.0 mile length from ARCO Tap to ARCO substation and for about a 16 mile length between Midway and ARCO Tap.

## DATA REQUESTS

160. After deletion of the queue generation projects R, T and Y from the 2004 summer peak, winter and heavy spring base cases with the system configuration and project interconnection assumed and inclusion of a third 500/230 kV transformer bank at the Midway substation as stated above, provide the following supplemental System Impact Study report prepared by PG&E, the Transmission Owner (TO). Analyze the system with and without the proposed plant of 600 MW nominal output, and include all system impacts and mitigation alternatives considered and then <u>selected</u> for 2004 summer peak, winter and spring system conditions.

a. Analyze system for Load Flows for N-0 (normal condition), for the N-1 (single contingencies & Cal-ISO Category B contingencies) and the N-2 (double contingencies & Cal-ISO Category C contingencies) system conditions for which overload criteria violations were already found and if necessary include additional critical contingencies. Include additional contingency analyses under critical 500 kV double line outage and bus fault conditions. In all studies consider established transmission line ratings according to seasons. Consider a few sensitivity case studies with higher/lower Path 15 and Path 26 flows. Provide a list of overload criteria violations in one table showing the loadings before and after the new generation and their differences side by side.

b. Considering the Path 15 upgrade project, including upgrading of Gates-ARCO-Midway 230 kV lines, analyze the system with interconnection alternatives for Load Flows for N-0 (normal condition), for the N-1 (single contingencies & Cal-ISO Category B contingencies) and the N-2 (double contingencies & Cal-ISO Category C contingencies) system conditions for which overload criteria violations were already found and if necessary include additional critical contingencies. Include additional contingency analyses under critical 500 kV double line outage and bus fault conditions. In all studies consider established transmission line ratings according to seasons. Consider a few sensitivity case studies with higher/lower Path 15 and Path 26 flows. Provide a list of overload criteria violations in one table showing the loadings before and after the new generation and their differences side by side.

c. Finalize and select the most feasible alternative for system configuration and project interconnection. List mitigation alternatives considered (with special attention given to Gates-Avenal-ARCO-Midway 230 kV line or any new interconnection line which may be directly affected by the AEP) and those selected for all criteria violations. SPS or operation solutions or system upgrades may be considered for 70 kV ARCO-Gates system.

d. Provide power flow diagrams (MVA, percent loading & P. U. voltage) for base cases with and without the project. Power flow diagrams must also be provided for all n-0, n-1 and n-2 studies where overload or voltage criteria violations appear.

e. Provide a list of all contingencies evaluated for each supplemental study.

f. Provide supplemental Short Circuit Study reports with selected alternative for system configuration and project interconnection in one table showing fault currents at important buses with and without the new generation, and respective breaker interrupting ratings side by side. Please identify mitigation alternatives considered and those selected for criteria violations.

g. Analyze system (with selected alternative for system configuration and project interconnection) for Transient Stability for full load rejection of the project and under critical N-1 and N-2 contingencies if found necessary.

h. Please provide electronic copies of the PSLF *.sav & *.drw files of the new base cases, and EPCL and/or AUTOCON contingency and comparison files. Provide electronic copies of the PSLF *.dyd and *.swt dynamic data files for winter and heavy spring cases.

161. For the reconductoring described in 7.a, 7.b and 7.c above, please provide the information per Attachment A.

## ATTACHMENT A

### Information Needed for a General-Level Analysis of Reconductoring

As we will be discussing by phone call on May 30, 2002, the following information is needed if your interconnection studies show that reconductoring of one or more electric transmission or distribution lines, beyond the point where the outlet line joins with the interconnected system is likely. The information is needed by staff to complete at least a cumulative-impacts-level of analysis of the potential effects that the reconductoring projects may have on the environment. Staff would use the data to discuss the potential effects of the reconductoring, and inform the Commission and the public about the potential indirect consequences of approving the project. This analysis would also provide information to the California Public Utilities Commission for use in conducting its CEQA review of the application by the transmission owner seeking authority to reconductor a line.

1. The location, rating and age of the line.
2. A basic, layperson's discussion of the reconductoring process for the line, identifying the techniques used, equipment required, vehicles (land and air), personnel required, parking and staging areas needed, and time needed to complete the reconductoring. This shall include:
   - Candidate locations (if available) and average acreage needed for tension and pulling stations, or, alternatively, the approximate number of pulling and tension sites and the average acreage per site.
   - Stringing method (slack or tension)
   - Need for reel or other storage near the lines.
   - Method and access (cherry picker, climbing tower, etc) to unclip the old conductor, install sheaves, and clip in the new conductor and "tension" lines.
   - General methodology for any needed tree trimming and brush clearing.
3. How access to the line and towers would be accomplished, including identifying any existing or needed access road to pull sites and staging areas.
4. If known, the location of any tower that would need to be modified or replaced, a basic description of the work that would be done to the tower, and a description of the potential impacts of that work.
5. Identity of any substations that will be added or expanded as a result of the reconductoring.
6. Recent aerial photographs (less than 5 years old) and topographic maps of the applicable line segments (i.e., the segments that would be replaced) with the transmission towers plotted on the photographs.
7. Identification of any sensitive habitats along the route by examining aerial photographs, conducting site visits, searching available databases (such as the Natural Diversity Database) and literature searches, etc.

8. Legible map(s) depicting biological resources (habitat, nesting areas, etc.) within 500 feet of the outside edges of the right of way for the transmission line corridor.

9. Identification of known cultural resource sites within ½ mile of the route based on a California Historic Resource Information System literature search and contact with the Native American Heritage Commission. This information should be provided as a legible map depicting the cultural sites, and must be submitted under confidential cover.

10. If any portion of the line is more than 45 years old, describe modifications/upgrades, if any, that have been made previously and provide any information indicative of the historic significance of the existing transmission line segment to be reconductored.

11. If an existing substation needs to be modified as a result of the proposed project, and it is more than 45 years old, describe modifications/upgrades, if any, that have been made previously, and provide any information indicative of the historic significance of the existing substation.

12. Legible map(s) showing existing land uses within 500 feet of the outside edges of the right of way, including identification of any school, hospital, daycare center, other sensitive receptors, and residential and commercial areas.

13. Identification of any potentially significant impact to the environment that may occur as the result of the reconductoring, construction technologies that are available to mitigate an impact, and mitigation measures that would reduce the impact to a less than significant level, including the standard environmental mitigation measures developed generically by the transmission owner and/or the CPUC for reconductoring projects.

14. Identity of any agency or other interested party with jurisdiction or permit approval authority over any part of the reconductoring project.

15. In general, provide facts to support conclusions about the potential for impacts and feasible mitigation, including impact avoidance measures.

**Technical Area: Visual Resources - Plume**
**Author**: William Walters

### BACKGROUND

Staff's review of the Applicant's cooling tower data provided in Table 1/revised Table 1 as part of Data Responses 126, 154 and 155 has determined that the heat rejection data does not always match that obtained from the heat balance provided in the AFC (Appendix 2-6), and does not match the exhaust parameters given in Table 1. Specifically, the cooling tower exhaust temperatures appear to be too high for the corresponding heat rejection listed in Table 1. The following presents a comparison of the stated heat rejection values given in Table 1, the heat rejection determined from the heat balance data from Appendix 2-6, Tables 2-6-1 through 2-6-6 of the AFC, and staff's heat rejection values based on a heat balance determined using the data in Table 1 and the water heat balance and flow information from Appendix 2-6, Tables 2-6-1 through 2-6-6 and Appendix 2-8, Table 2-8-1. Staff's cooling tower heat balance can be provided to the Applicant in spreadsheet form upon request.

## HEAT REJECTION RATE COMPARISON

| | Case A | Case B | Case C | Case D | Case E | Case F | Case G | Case H |
|---|---|---|---|---|---|---|---|---|
| Ambient Temp | 36 °F | 63 °F | 97 °F | 14 °F | 36 °F | 63 °F | 97 °F | 115 °F |
| Ambient RH | 85% | 54% | 24% | 64% | 85% | 54% | 24% | 9% |
| Duct Burners | On | On | On | Off | Off | Off | Off | Off |
| Cells in Operation | 7 | 7 | 7 | 5 | 7 | 7 | 7 | 7 |
| **Applicant Data ("Table 1")** | **446** | **465** | **534** | **285** | **334** | **332** | **333** | **477** |
| **AFC Data Heat Balance** | **446** | **446** | **477** | **ND** | **336** | **336** | **336** | **ND** |
| **Staff Heat Balance** | **561** | **551** | **572** | **364** | **396** | **395** | **389** | **574** |

Note: all values are converted to MW of heat rejection
ND – No Data

Since the plume frequency modeling results are a strong function of the cooling tower exhaust temperatures, staff needs to make sure that the data provided is correct before finalizing the plume frequency and plume dimension analysis for the cooling tower.

### DATA REQUEST

162. Please review the heat balance data and revise as necessary the heat rejection and exhaust variable data presented in the revised Table 1, which was provided as part of data response 154/155.

163. Please provide any revisions to the heat balance and water balance variables listed in Appendix 2.6 and 2.8.

164. Please provide a heat balance confirming the exhaust temperatures/revised exhaust temperatures; and all other cooling tower heat rejection and exhaust variables presented in Table 1, or revised as part of these data requests.

# AVENAL ENERGY PROJECT
# DATA REQUESTS
# (01-AFC-20)

**Technical Area: Public Health**
**Author**: Alvin Greenberg, Ph.D.
**Technical Senior**: Mike Ringer

## BACKGROUND

The AFC (section 2.3.7) states that the primary source of water for the project will be surface water from the San Luis Canal and that the backup water supply will come from groundwater pumped from nearby agricultural wells. These wells are identified on AFC Figure 2.1-5 and listed as existing wells 18-1, 18-4, and 24-5. The AFC further states on Table 2.3-1 that average daily use of water would be 1393 gpm and a maximum of 3146 gpm. The bulk of this water would be used at the cooling tower (1332 gpm and 2869 gpm, respectively).

The Phase I ESA prepared by TRC and included in the AFC as Appendix 6.14-1 notes that total chromium was detected in groundwater in 1988 under the PG&E Kettleman Compressor Station, located 1.3 miles southwest of the Avenal Energy Center Site, at concentrations as high as 6100 ppb. Wells located just north of the compressor station were found to be contaminated with hexavalent chromium at levels up to 10 ppb. Well 24-5 was tested for total chromium in 2000 and was non-detect (detection level not stated). Other non-identified agricultural wells located between the compressor station and the project site were tested for total chromium in 1985 and 1995 and were non-detect at a detection level of 10 or 20 ppb. The Phase I further states that any contamination found southwest, southeast, and northeast of the project site are considered "upgradient with respect to groundwater flow and, therefore, if release to groundwater from these sites were to occur they may have the potential to affect the [power plant] property, with respect to groundwater flow."

One of the backup sources of water for the project is groundwater from well 24-5 owned and used by Kochergen Farms. This well is located approximately 5000 feet northeast of the Kettleman Compressor Station and the contaminated groundwater. Given the continued pumping of groundwater from this well for agricultural uses and the daily demand of the project for cooling water should the backup water supply be needed by the project, CEC staff has concerns that the chromium contamination could move northeast and impact well 24-5 and perhaps other wells. Use of groundwater contaminated with hexavalent chromium in cooling towers would pose an unacceptable risk to public health.

## DATA REQUEST

165. Please provide a thorough analysis of the potential for the chromium contamination of groundwater beneath the Kettleman Compressor Station to migrate to wells which would be used as a backup water supply for the Avenal Power Project. In this assessment, provide a recommendation for additional periodic monitoring of wells in the area between the compressor station and the project site.